

CLAIMS

1. A color image processing apparatus of performing a color image display using a red display, a green display, a blue display and a white display, comprising:

white signal generation instrument which generates a white signal

(Formula 1)

$$W = \min(R_{in}, G_{in}, B_{in}),$$

based on an input red signal R_{in} for making said red display to be inputted, an input green signal G_{in} for making said green display to be inputted, and an input blue signal B_{in} for making said blue display to be inputted;

yellow signal generation instrument which generates a yellow signal

(Formula 2)

$$Y_e = \min(R_{in}-W, G_{in}-W),$$

based on said input red signal R_{in} to be inputted, said input green signal G_{in} to be inputted, and said generated white signal W ; and

first output white signal generation instrument which generates a first output white signal $W_{out}^{(1)}$ for making said white display to be outputted, based on said generated white signal W and said generated yellow signal Y_e .

2. The color image processing apparatus according to claim 1, wherein said first output white signal generation instrument generates said first output white signal $W_{out}^{(1)}$ (Formula 3)

$$W_{out}^{(1)} = W + K_1 \cdot Y_e$$

for a predetermined positive constant K_1 .

3. The color image processing apparatus according to claim 1, further comprising output blue signal generation instrument which generates an output blue signal B_{out} for making said blue display to be outputted, based on said input blue signal B_{in} for making the blue display to be inputted, said generated yellow signal Y_e , and said generated white signal W .

4. The color image processing apparatus according to claim 3, wherein said output blue signal generation instrument generates said output blue signal B_{out} (Formula 4)

$$B_{out} = B_{in} - L_1 \cdot Y_e \cdot W$$

for a predetermined positive constant L_1 .

5. The color image processing apparatus according to claim 1, further comprising cyan signal generation instrument which generates a cyan signal
(Formula 5)

$$Cy = \min(G_{in}-W, B_{in}-W),$$

based on said input green signal G_{in} to be inputted, said input blue signal B_{in} to be inputted, and said generated white signal W , and

second output white signal generation instrument which generates a second output white signal $W_{out}^{(2)}$ for making said white display to be outputted, instead of said first output white signal $W_{out}^{(1)}$, based on said generated first output white signal $W_{out}^{(1)}$ and said generated cyan signal Cy .

6. The color image processing apparatus according to claim 5, wherein said second output white signal generation instrument generates said second output white signal $W_{out}^{(2)}$

(Formula 6)

$$W_{out}^{(2)} = W_{out}^{(1)} + K_2 \cdot Cy$$

for a predetermined positive constant K_2 .

7. The color image processing apparatus according to claim 5, further comprising output red signal generation

instrument which generates an output red signal R_{out} for making said red display to be outputted, based on said input red signal R_{in} for making the red display to be inputted, said generated cyan signal Cy , and said generated first output white signal $W_{out}^{(1)}$.

8. The color image processing apparatus according to claim 7, wherein said output red signal generation instrument generates said output red signal R_{out} (Formula 7)

$$R_{out} = R_{in} - L_2 \cdot Cy \cdot W_{out}^{(1)}$$

for a predetermined positive constant L_2 .

9. The color image processing apparatus according to claim 5, further comprising magenta signal generation instrument which generates a magenta signal (Formula 8)

$$Ma = \min(B_{in} - W, R_{in} - W),$$

based on said input blue signal B_{in} to be inputted, said input red signal R_{in} to be inputted, and said generated white signal W , and

third output white signal generation instrument which generates a third output white signal $W_{out}^{(3)}$ for making said white display to be outputted, instead of said second output white signal $W_{out}^{(2)}$, based on said

generated second output white signal $W_{out}^{(2)}$ and said generated magenta signal Ma .

10. The color image processing apparatus according to claim 9, wherein said third output white signal generation instrument generates said third output white signal $W_{out}^{(3)}$ (Formula 9)

$$W_{out}^{(3)} = W_{out}^{(2)} + K_3 \cdot Ma$$

for a predetermined positive constant K_3 .

11. The color image processing apparatus according to claim 9, further comprising output green signal generation instrument which generates an output green signal G_{out} for making said green display to be outputted, based on said input green signal G_{in} for making the green display to be inputted, said generated magenta signal Ma , and said generated second output white signal $W_{out}^{(2)}$.

12. The color image processing apparatus according to claim 11, wherein said output green signal generation instrument generates said output green signal G_{out} (Formula 10)

$$G_{out} = G_{in} - L_3 \cdot Ma \cdot W_{out}^{(2)}$$

for a predetermined positive constant L_3 .

13. A color image processing method of performing a color image display using a red display, a green display, a blue display and a white display, comprising:

a white signal generation step of generating a white signal

(Formula 1)

$$W = \min(R_{in}, G_{in}, B_{in}),$$

based on an input red signal R_{in} for making said red display to be inputted, an input green signal G_{in} for making said green display to be inputted, and an input blue signal B_{in} for making said blue display to be inputted;

a yellow signal generation step of generating a yellow signal

(Formula 2)

$$Y_e = \min(R_{in}-W, G_{in}-W),$$

based on said input red signal R_{in} to be inputted, said input green signal G_{in} to be inputted, and said generated white signal W ; and

a first output white signal generation step of generating a first output white signal $W_{out}^{(1)}$ for making said white display to be outputted, based on said generated white signal W and said generated yellow signal Y_e .

14. The color image processing method according to claim 13, further comprising an output blue signal generation

step of generating an output blue signal B_{out} for making said blue display to be outputted, based on said input blue signal B_{in} for making the blue display to be inputted, said generated yellow signal Y_e , and said generated white signal W .

15. The color image processing method according to claim 13, further comprising a cyan signal generation step of generating a cyan signal

(Formula 5)

$$Cy = \min(G_{in}-W, B_{in}-W),$$

based on said input green signal G_{in} to be inputted, said input blue signal B_{in} to be inputted, and said generated white signal W , and

a second output white signal generation step of generating a second output white signal $W_{out}^{(2)}$ for making said white display to be outputted, instead of said first output white signal $W_{out}^{(1)}$, based on said generated first output white signal $W_{out}^{(1)}$ and said generated cyan signal Cy .

16. The color image processing method according to claim 15, further comprising an output red signal generation step of generating an output red signal R_{out} for making said red display to be outputted, based on said input

red signal R_{in} for making the red display to be inputted, said generated cyan signal Cy , and said generated first output white signal $W_{out}^{(1)}$.

17. The color image processing method according to claim 15, further comprising a magenta signal generation step of generating a magenta signal
(Formula 8)

$$Ma = \min(B_{in}-W, R_{in}-W),$$

based on said input blue signal B_{in} to be inputted, said input red signal R_{in} to be inputted, and said generated white signal W , and

a third output white signal generation step of generating a third output white signal $W_{out}^{(3)}$ for making said white display to be outputted, instead of said second output white signal $W_{out}^{(2)}$, based on said generated second output white signal $W_{out}^{(2)}$ and said generated magenta signal Ma .

18. The color image processing method according to claim 17, further comprising an output green signal generation step of generating an output green signal G_{out} for making said green display to be outputted, based on said input green signal G_{in} for making the green display to be inputted,

said generated magenta signal Ma , and said generated second output white signal $W_{out}^{(2)}$.

19. A program for enabling a computer to perform the color image processing method according to claim 13, comprising:

a white signal generation step of generating a white signal

(Formula 1)

$$W = \min(R_{in}, G_{in}, B_{in}),$$

based on an input red signal R_{in} for making said red display to be inputted, an input green signal G_{in} for making said green display to be inputted, and an input blue signal B_{in} for making said blue display to be inputted; a yellow signal generation step of generating a yellow signal

(Formula 2)

$$Ye = \min(R_{in}-W, G_{in}-W),$$

based on said input red signal R_{in} to be inputted, said input green signal G_{in} to be inputted, and said generated white signal W ; and a first output white signal generation step of generating a first output white signal $W_{out}^{(1)}$ for making said white display to be outputted, based on said generated white signal W and said generated yellow signal Ye .

20. A recording medium which records the program according to claim 19, and which is computer processable.